

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 00-049-PCT	FOR FURTHER ACTION see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
International application No. PCT/JP 00/ 07874	International filing date (day/month/year) 09/11/2000	(Earliest) Priority Date (day/month/year) 09/11/1999
Applicant KAO CORPORATION et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 3 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ the international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international search was carried out on the basis of the sequence listing :

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ the statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ the statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

2. ☐ **Certain claims were found unsearchable** (See Box I).

3. ☐ **Unity of invention is lacking** (see Box II).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is Figure No.

☐ as suggested by the applicant.

☐ because the applicant failed to suggest a figure.

☐ because this figure better characterizes the invention.

☒ None of the figures.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/JP 00/07874

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C01B39/02 C01B39/14 C11D3/12

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C01B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

WPI Data, PAJ, INSPEC, COMPENDEX, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 593 014 A (KAO CORP) 20 April 1994 (1994-04-20) claims 1,10 page 13, line 12 - line 23 page 9, line 19 - line 26	1,2,9, 11,12,14
Y	---	8
X	EP 0 184 244 A (SOLVAY) 11 June 1986 (1986-06-11) claims 1,6,9,10 page 4, line 1 - line 18 page 8, line 6 -page 9, line 2 figure 1	3,5-7, 11,12,14
Y	---	8
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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents :

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- * & * document member of the same patent family

Date of the actual completion of the international search

14 February 2001

Date of mailing of the international search report

21/02/2001

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INTERNATIONAL SEARCH REPORT

International Application No.

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 288 293 A (EXXON CHEMICAL PATENTS INC) 26 October 1988 (1988-10-26) claims 1,3,8,9 page 6, line 22 - line 26 page 7, line 6 - line 12	1,9,12
A	---	8
X	GB 1 297 140 A (THE BRITISH PETROLEUM COMPANY LIMITED) 22 November 1972 (1972-11-22) the whole document	1
A	---	2
X	US 4 385 042 A (YAN TSOUNG Y ET AL) 24 May 1983 (1983-05-24) claim 1 column 17, line 17 -column 18, line 38 figure 4	3,4
X	GB 2 252 305 A (FORET SA) 5 August 1992 (1992-08-05) the whole document	3,12,14
X	FR 2 552 070 A (RHONE POULENC CHIM BASE) 22 March 1985 (1985-03-22) claims 1,8-12 page 8, line 15 - line 25 tables 1A,1B example 4	3,10-12, 14
X	US 4 102 977 A (IMAFUKU SHIGEHISA ET AL) 25 July 1978 (1978-07-25) abstract column 3, line 21 - line 59 column 11, line 6 -column 12, line 63	13

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/JP 00/07874

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 0593014	A	20-04-1994	DE 69303572 D	14-08-1996
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			JP 2633182 B	23-07-1997
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International Application No

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US 4102977 A		DE 2652409 A	26-05-1977
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		GB 1571004 A	09-07-1980
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		NL 7612844 A,B,	23-05-1977
		US 4219535 A	26-08-1980
		US 4238346 A	09-12-1980
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THE FOLLOWING IS THE AMENDMENTS TO THE CLAIMS OF
THE INTERNATIONAL APPLICATION UNDER PCT ARTICLE 19:

AMENDED SHEETS (Pages 55, 56 & 57).

CLAIMS

1. A process for preparing fine zeolite particles comprising reacting a silica source with an aluminum source in the presence of an alkaline earth metal-
5 containing compound.

2. The process according to claim 1, wherein the alkaline earth metal is Ca and/or Mg, and wherein the alkaline earth metal-containing compound is used in an amount such that an $\text{MeO}/\text{Al}_2\text{O}_3$ molar ratio is 0.005 to 0.1, wherein Me is Ca
10 and/or Mg.

3. A process for preparing fine zeolite particles comprising feeding for reaction an aluminum source and/or a silica source into a circulating line connected to a reaction tank.
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4. The process according to claim 3, wherein the aluminum source and/or the silica source is fed into the circulating line connecting between an outlet of the reaction tank and an inlet of a mixer.

20 5. The process according to claim 3 or 4, wherein the aluminum source is supplied to the reaction tank and circulated in the circulating line, and wherein the silica source is fed into the circulating line.

25 6. The process according to claim 3 or 4, wherein the silica source is supplied to the reaction tank and circulated in the circulating line, and wherein

the aluminum source is fed into the circulating line.

7. The process according to any one of claims 3 to 6, wherein the aluminum source and the silica source are mixed in the circulating line at a mixing ratio of 0.1 to 3, as expressed by an $\text{SiO}_2/\text{Al}_2\text{O}_3$ molar ratio.

8. The process according to claim 1 or 2, wherein the aluminum source and/or the silica source are fed for reaction into the circulating line connected to the reaction tank.

9. The process according to any one of claims 1 to 8, wherein the fine zeolite particles have the general formula in anhydride form:



wherein M is an alkali metal; Me is an alkaline earth metal; x is a number of 0.2 to 2; y is a number of 0.5 to 6; and z is a number of 0.005 to 0.1.

10. The process according to any one of claims 1 to 9, wherein the fine zeolite particles have an average primary particle size of 1.5 μm or less.

11. The process according to any one of claims 1 to 10, wherein the fine zeolite particles have a cationic exchange speed of 150 mg CaCO_3/g or more.

12. Fine zeolite particles obtainable by the process according to the process of any one of claims 1 to 11.

13. Fine zeolite particles satisfying the relationships:

$$0.6 \leq X \leq 1.5,$$

$$20X/3 - 2.4 \leq Y \leq 15,$$

5 with proviso that $X \leq Y$,

wherein an average primary particle size is $X \mu\text{m}$, and an average aggregate particle size is $Y \mu\text{m}$.

14. A detergent composition comprising the fine zeolite particles of claim 12
10 or 13.